



# Self-Sampling Guide

DIYKIT

# DIYKIT

Welcome to this self sampling kit for soil and leaf analysis



## In here you'll find:

- Advice on how to collect soil and plant samples
- An Analysis Request Form to indicate which tests you require
- Sample Bags for both soil and plant samples
- A CourierPost bag to return your samples and request form to the lab

This brochure will guide you on how to take samples. It covers:

- An explanation of why testing is important
- Some general comments about sampling
- Sampling from pastoral farms
- Sampling from horticultural and arable crops
- Which tests to select
- Other services

Before starting...

# Soil & Plant Sampling



## Why test soil and plant tissue?

Soil and plant analysis helps growers and their advisors choose the best fertiliser programme, and highlights mineral imbalances that might be affecting the health of the crop or animals that feed on it.

Plants require an adequate supply of a wide range of nutrients if they are to grow well.

**Soil Testing** measures the 'reservoirs' of nutrients that are potentially available to the plants, as well as the soil's physical and chemical characteristics.

**Plant Analysis** provides a direct and accurate method of measuring the levels of nutrients that plants are actually extracting from the soil. In the case of forage crops, it is also a way of measuring the nutrients being made available to your stock.

For example, trace elements which are important for animal health – such as molybdenum, cobalt and selenium – can be reliably assessed using pasture analysis.

### SOIL TESTING VS. PLANT ANALYSIS?

We are often asked which is more appropriate: soil testing or plant analysis. The answer is neither; the two techniques – when used in conjunction – will provide a better overall picture of a farm or orchard's nutrient status than either used alone.

For this reason, we recommend that you submit both soil and plant samples (at the appropriate sampling times) for analysis to get the best information.

### IT'S IMPORTANT TO TAKE SOME TIME TO PLAN YOUR SAMPLING STRATEGY

To get the most from soil and plant testing, we recommend that you divide the farm or block into several sampling areas – depending on soil type, crop grown, contour, land management and fertiliser history (normally 3 to 5 areas are sufficient).

Ideally one soil sample and one plant sample would be collected from each area. However, for cost considerations, it is usual to take one soil sample from each and to restrict plant samples to between one and three for the whole property.

### CONTOUR

The production potential of an area partly depends on its contour. Other things being equal, flat areas have the potential for greater returns on your fertiliser expenditure than steep areas.

### FERTILISER HISTORY

Past fertiliser applications will influence present soil fertility and need to be taken into account.

### SOIL TYPE

Different soil types have different soil characteristics and fertiliser requirements. Your sampling strategy needs to take these into consideration.

### LAND USE

The type of stock or crops that you plan for an area will be a factor in working out the best fertiliser type and application rate.

### MONITORING VS. DIAGNOSING

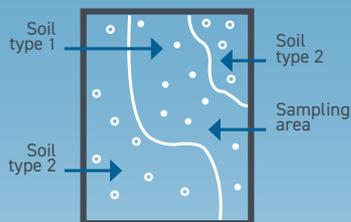
Most testing is done to monitor nutrient levels at a particular growth stage of the crop. Sometimes it may be necessary to diagnose an immediate problem. In this situation it is often useful to select one sample from a well performing site and another from a poor site. By direct comparison of the two sets of test results a faster and more useful interpretation may be possible.



# Sampling Pastoral Farms

## COLLECTING SOIL SAMPLES

Select sites using a random or zig-zag pattern, to ensure that the sampling sites are representative of the whole area. For each sample area, take 20 soil cores, and combine them into one sample bag.



## OR

- Select a straight sampling line, or transect, 100-200 metres long across each of the chosen areas. Permanently mark these transects, so that future samples can be taken from the same line. Collect a core sample every ~10 metres until 20 core samples have been obtained to create one sample bag for analysis from each transect.
- Use a soil auger to sample to a depth of 7.5 cm. Alternatively use a clean spade and ensure that the cores are oblong and not wedge-shaped.
- If necessary, reduce the sample size to about 500 mL after first mixing the cores in a clean plastic bucket.
- Avoid abnormal areas such as dung or urine spots, around troughs or gates, along fencelines, under trees. It is best to avoid sampling from paddocks that have recently been grazed, as the fresh urine spots might not be obvious.
- Do not sample within three months of applying fertiliser or lime.

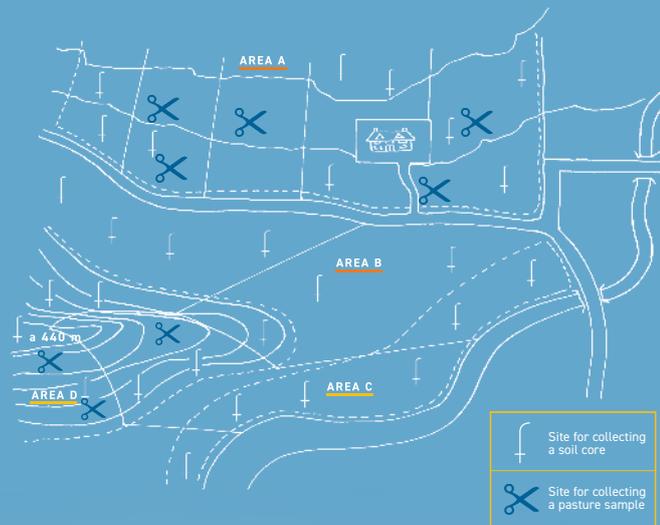
## COLLECTING PASTURE SAMPLES

- Sampling areas should correspond to the main animal grazing areas.
- As with soil samples, use a random or zig-zag pattern when selecting the site for each handful.
- Take 12 to 20 small handfuls of grass from sites throughout the sampling area, and combine them into one sample bag.
- Collect by cutting at grazing height (about 5cm from the ground) with clean shears or scissors.
- Try to ensure that the sample is representative of what the animals are eating.
- Plants should not be in seed, or under drought stress. Herbage samples should be taken at a time when the plants are actively growing (such as during the spring or autumn flush).
- Avoid contamination of pasture samples. Traces of soil or chemicals (such as drench) on your hands can produce inflated trace element results. For this reason, if possible have herbage samples collected by someone else if you are collecting soil samples too. Rust or dirt on shears/scissors is another potential source of contamination to avoid.

## For example:

This farmer divided the farm into 4 sampling areas (denoted by the dotted line), and collected 4 soil samples (areas A,B,C,D) and 2 pasture samples (areas A,D).

<b>AREA A</b>	Easy hills, used as main grazing area for dairy herd (30 day rotation). Applied 30% super- phosphate 11 months ago. Clay/loam soil.
<b>AREA D</b>	Steep hill country, used as run-off for weaner heifers. Hasn't had any fertiliser for the last 5 years. Clay soil.
<b>AREA B</b>	Road flats, used as grazing for Simmental stud herd. No fertiliser for the last 2 years. Loam soil.
<b>AREA C</b>	River flats, used as hay paddocks (summer) and for dry stock (winter). No fertiliser for the last 2 years. Silt soil.



# Special Pasture Production & Animal Health Considerations

Two additional test approaches should also be considered:

**Clover-Only Analysis**, when pasture production is poor; and **Animal Testing**, to check directly the mineral status of your livestock.



## CLOVER-ONLY ANALYSIS

If your main concern is to determine why your pasture is not growing so well, then a clover-only sample is preferable to mixed pasture sampling because:

- a) healthy clover is the main source of nitrogen for pasture; and
- b) clover is likely to develop mineral deficiencies well before the problems appear in grass species.

Select clover plants that appear to be growing poorly (e.g. small, stunted plants; and/or plants exhibiting unusual leaf colour). Collect a minimum of 100 individual blades of this clover by cutting with clean shears or scissors (include the stems as well as the clover leaves).

## ANIMAL TESTING

If you have concerns about the health of your stock, then in addition to analysing their feed (through pasture and feed quality analysis), you might consider testing the animals themselves. Your local veterinarian is able to take blood or liver samples and arrange for them to be analysed by an appropriate laboratory. Hill Labs does not analyse animal samples.

*NOTE: one clover-only sample from the poorest growing part of the farm, is usually sufficient.*

# Sampling other crops

## COLLECTING SOIL SAMPLES

Tree and field crops should be sampled to a 15 cm depth from the root zone of the crop.



In the case of tree crops, take two cores from the rooting zone of 10 trees selected on two diagonal lines through the area of interest.



Avoid sampling near boundary rows, track or outside the drip zone of trees.



For grapes, kiwifruit or other crops that are planted in hedgerows, take 12-20 cores from the rooting zone of the vines according to the diagram.

If the orchard has herbicide treated strips, these should be sampled separately from grassed areas between rows.

## COLLECTING PLANT TISSUE SAMPLES

Sampling times, plant parts and sample sizes for some of the more common crops we encounter are listed over the page. If your crop is not listed, contact your consultant or the laboratory for information.

Alternatively, visit [www.hill-labs.co.nz](http://www.hill-labs.co.nz) for more comprehensive sampling information. Please note that the quality of the interpretive information we supply depends on the correct sampling procedure being followed and the sample being identified correctly.



# Horticulture



## AVOCADO

<b>Time</b>	April to May, when the summer flush has ceased
<b>Collect</b>	Shoots that are not flushing nor fruiting. Select from the canopy of the trees at shoulder height, and exclude boundary trees
<b>Size</b>	4-8 leaves from each of 20 trees

## CITRUS

<b>Time</b>	February to March
<b>Collect</b>	Spring flush growth from non-fruiting laterals (extension growth), taken at shoulder height
<b>Size</b>	40-60 leaves from trees selected at random from throughout the block

## GRAPE

<b>Time</b>	1) During flowering OR 2) During fruit ripening
<b>Collect</b>	Opposite the basal cluster, from exposed shoots on the outside of the vine
<b>Size</b>	1) 40 petioles OR 2) 40 leaf blades only OR 3) 40 leaf blade & petiole (separated)

## KIWIFRUIT

<b>Time</b>	October to March
<b>Collect</b>	See crop guide
<b>Size</b>	2-4 leaves from each of 20 vines

## PIPFRUIT/STONEFRUIT

<b>Time</b>	1) Early season OR 2) January/February
<b>Collect</b>	Mid portion of the current season's non-fruiting laterals (extension growth), taken at shoulder height
<b>Size</b>	4 representative leaves from the periphery of each of 15-25 trees

## STRAWBERRY

<b>Time</b>	During fruiting, preferably at first harvest
<b>Collect</b>	Youngest mature leaves
<b>Size</b>	30-50 leaves

**Fertiliser Recommendations:** Hill Labs provides an analytical service and not the subsequent fertiliser recommendations. For fertiliser advice, please talk to your local fertiliser supplier, merchant or farm advisor.

# Arable



## CEREAL

<b>Time</b>	When stem extension is complete and the head of the ear emerges from the boot
<b>Collect</b>	Random sites throughout the sampling area
<b>Size</b>	20 to 30 plants



## FORAGE BRASSICA

<b>Time</b>	At mid growth
<b>Collect</b>	Youngest mature leaf
<b>Size</b>	20 to 30 leaves



## MAIZE

<b>Time</b>	1) Seedling OR 2) 5-6 wks, V4/V5 leaf stage OR 3) 50% Silk
<b>Collect</b>	The ear node leaf
<b>Size</b>	20-25 leaves

# Vegetable



## BRASSICA

<b>Time</b>	Mid-growth, or when the plant is starting to head
<b>Collect</b>	Wrapper leaf, or youngest mature leaf
<b>Size</b>	20 to 30 leaves



## POTATO

<b>Time</b>	When the tubers are half grown
<b>Collect</b>	Fourth or fifth leaves from the top
<b>Size</b>	25-50 leaves from 25 randomly selected plants



## PUMPKIN/SQUASH

<b>Time</b>	During fruit set
<b>Collect</b>	Youngest mature leaf
<b>Size</b>	20-30 leaves

# Test Selections

Select the tests you would like us to perform on your samples from the lists on the right. For easier selection, we have provided some recommended tests for various crops.

## ■ SOIL TESTS

**Basic Soil:** volume weight, pH, Olsen phosphorus, potassium, calcium, magnesium, sodium, C.E.C, base saturation

**Pasture:** basic soil plus sulphur profile

**Arable Crops:** basic soil, sulphur profile plus available-N

**Vegetables:** basic soil plus sulphur profile, available-N

**Avocado:** basic soil plus mehlich 3

**All Others:** check crop guide

### Individual Soil Tests\*:

- soluble salts, anion storage capacity, organic matter, available-N, reserve magnesium, aluminium, boron
- resin phosphorus, total nitrogen, total phosphorus, total selenium, total sulphur
- sulphur profile (organic S and sulphate-S)
- C/N Ratio
- reserve potassium
- trace metals (manganese, zinc, copper, cobalt)
- mehlich 3 - P, S, Mn, Zn, Cu, Co, B, Al, Ca, Mg, K, Na

## ■ PLANT TESTS

**Basic Plant:** nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, sodium, iron, manganese, zinc, copper, boron

**Mixed Pasture:** basic plant plus molybdenum, cobalt, selenium, crude protein, ME

**Clover Only:** basic plant plus molybdenum

**Kiwifruit:** basic plant plus chloride

**Avocado:** basic plant plus chloride

**Brassica:** basic plant plus molybdenum

**Pumpkin/Squash:** basic plant plus molybdenum

**All Others:** check crop guide

**Individual Plant Tests\*:** molybdenum, cobalt, selenium, sulphate-S, chloride, aluminium, nitrate-N, iodine

## ■ FEEDSTUFF TESTS

**Silage:** dry matter, crude protein, crude fat, ash, ADF, NDF, digestibility (DOMD), ME, pH, ammonium-N (as % Total N), soluble sugars, starch

**Feed:** dry matter, crude protein, crude fat, ADF, NDF, ash, soluble sugars, starch, digestibility (DOMD), ME

### Dry Matter Only

**Volatile Fatty Acid Profile** (silages only)

\*These tests will incur a sample preparation fee if selected without one of the main profiles. A schedule of prices for these and other tests is available from the laboratory or visit the publications page on our website [www.hill-labs.co.nz](http://www.hill-labs.co.nz)

## Dispatch Instructions



### ■ SECURE IN BAG AND RECORD DETAILS

Put the sample material (soil core or pasture) into a clean sample bag. When sufficient material has been collected for the area, secure the bag by removing the backing tape on the adhesive strip; fold over the top of the bag and press down. Record the sample area's name on the outside of the bag. Please complete the analysis request form to ensure sample processing can proceed without any delays.

### ■ RUSH TO THE LABORATORY

Place sample bags and the completed analysis request form in the freepost bag provided, and mail them to Hill Labs as soon as possible. If samples have to be left overnight, store them in a refrigerator.

*NOTE: It is not necessary to send payment with the samples. An invoice will be issued with the results.*

### ■ HOW LONG WILL IT TAKE?

We will start processing your sample(s) immediately upon receipt. Our turnaround times are usually within 5 working days for routine analysis. However tests that are outside our routine analysis may take longer - contact the laboratory for more information. Once the results are available they will be sent out to you as requested on the Analysis Request Form.

### ■ WHAT WILL YOU RECEIVE?

As well as the analytical results, our reports also present some interpretive information indicating whether your results are low, medium or high. To do this we rely on you to provide the information necessary for us to correctly identify your crop. We can also mail or email an additional copy of the report to a third party you nominate (e.g. your consultant).

### ■ CAN WE HELP FURTHER?

Hill Labs is an independent laboratory. It is owned and operated by its senior analysts who have a personal commitment to providing consistent, timely and accurate results. This is achieved through the use of the most advanced equipment and techniques by our highly skilled team of scientists and technicians. If you would like more information about how we as a company might be able to help you further, please don't hesitate to ask the staff of Hill Labs.



## Other analytical services we offer

Agriculture	Environmental	Food & Bioanalytical
Soil	Soils	Pesticides
Plant	Biota	Animal Remedies
Hydroponic Nutrient Solutions	Contamination	Composition
Potting Media	Drinking Water	Raw Materials
DDT	Irrigation Water	Food and Dairy Products
Composts	Effluents	Microbiology
Feedstuffs	Trade Wastes	
Organic Farming	Landfill Monitoring	
	Compliance Monitoring	
	Pesticides	
	Microbiology	
	Workplace Monitoring	



Hill Labs is accredited by International Accreditation New Zealand to NZS/ISO/IEC 17025:1999

We would love to hear from you!

- 0508 HILL LAB (44 555 22)
- mail@hill-labs.co.nz
- facebook.com/hill-labs